CropGuard Training Manual

Here at CropGuard safety is our number one priority when flying our UAS. Our focus on safety is not solely on the UAS, but more importantly the safety of the public and the environment. Our ability to safely operate our UAS remains critical to the success of the organization. If we cannot operate safely, we put the public at risk and possibly expose the environment to a catastrophic event. If you notice something that places, you, the public, the environment or the UAS in danger, you should stop operations as soon as practical to address the dangerous situation.

To ensure our safety goals are met, each pilot will be required to show proficiency in the following areas.

UAS operations and maintenance

Assessing dangers before, during and after flight operations

Tracking and recording flight data (not obtained by UAS)

Prior to any UAS flights for CropGuard, the owner will test each associate for their level of understanding of the above noted information. The associate be required to show the owner their expertise in the following areas:

UAS Operations and Maintenance

1. FAA guidelines
    a. All associates will be required to show their expertise in the area of the FAA guidelines for UASs.
2. UAS
    a. All associates will be required to show their expertise in area of Crop Guard UAS, such as what are the rotors and how do they propel the unit.
3. Safety Features
    a. All associates will be required to show their expertise of the safety features of CropGuard's UASs, such as how the return to home function operates. They will also be tested in mitigation procedures to reduce risk associated with the flight of a UAS.
4. Safe handling of chemicals
    a. All associates will be required to exhibit their knowledge of safe handling of CropGuard's chemicals and within 2 months of employment, to obtain the Ohio Chemical Applicator operating license.
5. Technology
    a. All associates will be required to show their expertise in the technology provided by each UAS in our fleet, such as how the OmniDirectional Digital Radar operates and how to program the unit for automated flight.
6. Power
    a. All associates will be required to show their expertise in powering up the UAS and the steps necessary to keep the unit operational with its individual power program.
7. Weather

    a. All associates will be required to show their expertise in how weather can/will impact the flight of the UAS.
8. Preflight
    a. All associates will be required to show their expertise in the CropGuard preflight checklist such as walking the perimeter and identifying potential dangers and avoidance options prior to takeoff.
9. Flight maneuvers
    a. All associates will be required to show their expertise in flying the UAS such as showing their skill in takeoff, hovering and landing. In total the associate must expend a minimum of 20 hours working with the owner of CropGuard to ensure a proficiency in this area.
10. Emergency plans
    a. All associates will be required to show their expertise during in flight emergencies, which will take place during the 20 hours of flight time with the owner.
11. Advanced UAS operations
    a. All associates will be required to show their expertise in how the UAS delivers our product to the customer.
12. Flight debrief
    a. All associates will be required to show their expertise in the CropGuard debriefing after a flight, including documenting the flight for tracking purposes.
13. Flight Log
    a. Each associate will be required to show their expertise in documenting each flight and the information necessary to meet the FAA standards.
14. Communication
    a. All associates will be required to exhibit their understanding of appropriate communications, such as communicating with an airport tower.

It is expected each associate will have the knowledge and skills to pilot a UAS within 60 days of employment. Upon expertise being exhibited in those areas, the associate will then move into hands on training with a UAS under full supervision of an experienced flight member of CropGuard.

On a yearly basis each operator of a UAS will be required to show the owner their proficiency in each of the areas noted above. The ability to meet these requirements will be required to remain employed by CropGuard and to operate our UASs.

The ability to exhibit these skills is paramount to the safety of the public, the environment, our UASs and ultimately the pilot. A failure in any area can result in injury and ultimately the unintended losses. Please remember Safety First.

CropGuard Flight Operations Manual

(Many flight manual procedures were adopted from Oak Ridge National Laboratory "Best Practices for Unmanned Aerial Systems" February 2017) and the City of Los Angeles UAS Flight Operations Manual)

1. Flight Manual
    a. CropGuard provides these procedures to exhibit a safe operating organization. While efficiency is important, safety will always remain our number one goal. This manual is not exclusive as other available information should be considered such as FAA regulations, manufactures manuals and safety manuals. The document should be considered living and will be adapted by the owner of CropGuard when appropriate.
2. FAA Regulations
    a. When operating a CropGuard UAS, our operators will follow all FAA Regulations for flight.
3. Protection of Rights and Privacy
    a. All CropGuard UAS pilots should be aware of the impact the flight will have on the public and the environment. This awareness should include the impact and flight may have on the privacy of an individual. If an issue arises, the flight should be ended and a new solution to address the issue should be identified and implemented. Private property should be avoided as appropriate to ensure there are no privacy concerns to begin with as well as to limit any safety issues that might arise. When appropriate, the UAS pilot should obtain permission to fly in a specific area to ensure no issues arise. The flights should focus on ensuring as little as possible noise pollution to the surrounding area. Please keep in mind how the flight may impact livestock in the general area.
4. Safety
    a. CropGuard remains committed to a safe work environment for the public, it's employees and the environment. Remember, Safety First. The person ultimately responsible for safety is the President.
    b. All associates are responsible for safety here at CropGuard and as such are expected to report safety issues and effectively reduce or eliminate issues that may arise. The PIC is responsible for safety on site and has the final decision on if a flight leaves the ground.
    c. Flights should never be flown over people not participating in the flight. All flights will have a plan to address an emergency situation that may occur and these plans will be prepared prior to lift off.
    d. Flights will never take place within 5 miles of an airport without prior approval. A UAS should always be operated from a fixed position with views of the UAS as it operates.
    e. All accidents will be reported immediately to the owner of CropGuard, who will then undertake and investigation as to the facts of the loss. A CropGuard associate should never delay taking emergency action while waiting for the investigation to begin or be completed.
    f. All safety training will be completed on a weekly basis via the coordination of the owner of CropGuard. All associates are expected to attend the training regardless of other conflicts.
    g. All associates are expected to utilize PPE for their protection.

h. All pilots are expected to report any illness or medications that might impact the safe flight directly to the owner.
i. All power supplies should be properly charged and stored per the manufacturer guidelines.

5. Flight Operations
    a. All flights will be approved by the president of CropGuard.
    b. All required FAA documentation will be maintained by the PIC at the site.
    c. If a UAS has not been operated for 30 days, the President will test operate prior to a commercial flight with the focus on any issues with the UAS.
6. PreFlight
    a. The PIC shall complete a preflight inspection of the UAS. They will then complete a preflight inspection of the area to be flown to ensure all hazards are identified and a solution is developed.
    b. Always remember that anything can happen and an emergency plan may not have considered a specific event. The experience of the PIC will be required to overcome any hazards that were not planned. This requires extra time at each flight location to ensure even the most limited hazards are considered.

6.. Emergency reporting to FAA

a. All PIC will be provided information for reporting emergencies to the FAA. They can also obtain the information on the FAA website by searching for the FAA Accident Reporting and Regional Operations Centers.

7. Flight rules

a. All CropGuard flights must adhere to the following guidelines:

i. A UAS may fly no higher than 75 feet.

ii. The UAS shall never exceed a speed of 30 MPH.

iii. The UAS should always be flown in VFR of the PIC.

iii. The UAS will only be flown after daylight hours with operational flashing anticollision lights visible from 3 miles away.

iv. The UAS will never operate in inclement weather as determined by approved FAA weather providers. If unexpected weather events occur, the PIC will terminate the flight immediately.

v. The UAS will always yield the right of way to another aircraft regardless of being manned or unmanned.

vi. The UAS will never operate over people unless those people are a part of the flight crew.

vii The UAS will always be flown from a fixed location.

viii. The UAS will never be flown to the flight location.

ix. The appropriate power source will be inspected the evening before the scheduled flight by the PIC. The PIC will also ensure the power source is in expected working order the day of the flight prior to leaving the home base.

x. The PIC will never operate a unit outside of the manufacturer guidelines such as carrying a heavier load than approved in the manual.

8. Inspections

a. Pre and post flight inspections are required to identify abnormalities with the UAS. Any abnormalities should be documented and reported directly to the owner of CropGuard.

b. The weather shall also be included in the pre and post flight documentation. We recommend the use of checklists to ensure a consistent capturing of information on each UAS.

Weather

a. The PIC shall ensure the weather allows for a safe flight before each operation.

Flight Logs

a. The UAS will maintain a limited amount of flight log data. The PIC is expected to obtain and document other pertinent information that is not captured by the UAS.

CropGuard PreFlight Checklist	
Landing and takeoff zone is appropriate and a secondary location is identified	What obstacles present themselves (trees, power poles, structures, homes, aircraft)
Are propellers damage free and is the unit free of debris	Are safety markers appropriate and installed if necessary
Is the unit connected to the app and is the firmware current	Is the power source properly fueled
Is unit capable of delivering load as expected	Is flight plan appropriate
Check for people or structures in flight zone	Is weather as expected
Are all FAA documents present at the site	Ensure unit is calibrated for take off and landing location
Verify RTH is in working order	Is the PIC medically capable of flying UAS
Check NOTAMS	
CropGuard Post flight checklist	
Clean up and inspect for damage	Clean delivery units and inspect for damage
Report any damage to President	Report any flight discrepancies to President
Disconnect any power source from unit	Complete flight data details